CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. R2-2006-0065

SITE CLEANUP REQUIREMENTS
AND RECISSION OF ORDER NO. 93-046

FOR
CONOCOPHILLIPS COMPANY

SAN FRANCISCO REFINERY
1380 SAN PABLO AVE., RODEO, CA
CONTRA COSTA COUNTY

TABLE OF CONTENTS

ACRONYMS and DEFINITIONS

µS/cm	microseimens per centimeter (units for electrical conductivity)
AOC	area of concern
A-Zone	shallow groundwater aquifer
AVOCs	aromatic volatile organic compounds
bgs	below ground surface
B&C	Brown & Caldwell
B-Zone	deep groundwater aquifer
CEQA	California Environmental Quality Act
COCs	constituents of concern
CWC	California Water Code
Discharger	ConocoPhillips Company
ESB	effluent safety basin
Facility	ConocoPhillips San Francisco Refinery
FPLH	free-phase liquid hydrocarbons
gpm	gallons per minute
LTA	Land Treatment Area
MGD	million gallons per day
mg/L	milligram per liter (concentration in water, equivalent to ppm)
MSB	Main Storm Basin
MTBE	methyl tertiary-butyl ether
MW-### EEI-###	monitoring well identification
MWH	Montgomery Watson Harza
NPDES	National Pollutant Discharge Elimination System
Outfall Ditch	former PG&E outfall ditch
PG&E	Pacific Gas and Electric
ppm	parts per million
PSB	Primary Storm Basin
RCRA	Resource Conservation Recovery Act
Refinery	ConocoPhillips San Francisco Refinery
RWQCB	Regional Water Quality Control Board
San Francisco Refinery	ConocoPhillips San Francisco Refinery
SCR	Site Cleanup Requirements
Selby	Selby Bulk Storage Terminal (owned by Wickland Co.)
Site	ConocoPhillips San Francisco Refinery
SVOCs	semi-volatile organic compounds
TPH	total petroleum hydrocarbons
TPH-d	total petroleum hydrocarbons as diesel
VOCs	volatile organic compounds
WCC	Woodward Clyde Consultants
WMU	waste management unit
WDR	Waste Discharge Requirements

FINDINGS

The California Regional Water Quality Control Board, San Francisco Bay Region (Board), finds that:

1) Site Location

The San Francisco Refinery is located at 1380 San Pablo Avenue, Rodeo between the cities of Crockett (to the northeast) and Rodeo (to the south) (Fig.1). The terms "San Francisco Refinery", "Refinery", "Facility", and "Site" are used interchangeably for the purpose of this Order. The Refinery encompasses an area of approximately 1,100 acres. Interstate 80 bisects the Site, with approximately 40% of the Facility lands located west of the highway. The two most prominent topographic features at the Refinery are Tormey Hill Ridge, which extends along the northeastern boundary, and the central valley that lies between Tormey Hill Ridge and lower hills to the southwest. The majority of the Facility is constructed on the central valley. The northwestern boundary of the Refinery is located along the shoreline of San Pablo Bay. Approximately 95% of the area included within the Refinery's boundaries drains along the valley toward San Pablo Bay. A small amount of the total drainage flows northward into Cañada del Cierbo valley (Fig.2).

2) Site Ownership and Operation

ConocoPhillips Company owns and operates the San Francisco Refinery, a petroleum refinery. ConocoPhillips maintains approximately 100 aboveground storage tanks, including four butane spheres and several industrial water tanks. The total maximum storage capacity is about 8,500,000 barrels (42 gallons/barrel). Daily crude throughput is approximately 106,000 barrels. Site ownership and operation history is summarized below in Table 1.

Table 1. Site Ownership and Operation History

Year	Owner/Operator
1896 to March 31, 1997	Unocal Corporation
April 1, 1997 to 2001	Tosco Corporation
2001 to 2002	Phillips Petroleum
2002 to present	ConocoPhillips

Refinery operations at this location began in 1896. Currently, the Refinery receives crude oil and other feedstocks by vessels and pipelines. Refined products are delivered to customers via tanker barge, rail cars, trucks and pipelines. Crude oil is cracked and processed at the Site to produce gasoline, diesel fuel, and jet fuel. Sulfur and petroleum coke are by-products. Lubricating oils and food grade waxes were manufactured at the Site until November 1997. Wastes generated from the refining and manufacturing processes were historically disposed of at various Waste Management Units (WMUs) throughout the Refinery or sent to off-site disposal facilities (Fig.3).

In December 2003, ConocoPhillips purchased the former Pacific Gas and Electric (PG&E) Company Oleum Power Plant, which is located in the interior of the western side of the Refinery (Fig.3). The former PG&E Oleum Power Plant property and Outfall Ditch are now part of the Refinery, and subject to this Order, with the exception of a small relay structure that PG&E maintains ownership of in the central portion of the property.

3) Named Discharger

Herein after, the term Discharger shall refer to the ConocoPhillips Company. ConocoPhillips is named as the Discharger because ConocoPhillips is the property owner and operator.

4) Purpose of Order

The purpose of this Order is to update the Site Cleanup Requirements for the ConocoPhillips Company, San Francisco Refinery, Rodeo. Pursuant to the California Water Code (CWC), Section 13304, this Order requires Site investigations be made and corrective action measures implemented for specified areas of the Refinery (Fig.4). The tasks in this Order require the Discharger to:

a. Evaluate the effectiveness of groundwater control and free-phase liquid hydrocarbon (FPLH) recovery between the existing segments of the groundwater interceptor trench;

b. Evaluate groundwater hydraulic control and potential contaminant discharge to San Pablo Bay along the Refinery perimeter shoreline areas not protected by groundwater interceptor trench segments;

c. Re-evaluate persistent petroleum hydrocarbons in interior "hot spot" areas of the Refinery;

d. Evaluate the effectiveness of the existing groundwater extraction/FPLH recovery systems; and

e. Evaluate the coverage of the existing perimeter groundwater monitoring network.

Descriptions of the Areas of Concern (AOCs) are provided in Finding No. 13.

5) Regulatory History

a. **Site Cleanup Requirements (SCR)**

The Board adopted SCR Order No. 93-046 on May 19, 1993 requiring the Discharger to:

- Prepare a corrective studies work plan to prevent migration of polluted groundwater into San Pablo Bay;
- Perform additional groundwater monitoring at the Seasonal Products Tank Farm (Fig.3);
- Develop a recovery system for floating hydrocarbons;
- Assess existing monitoring wells for effectiveness and adequacy of coverage; and
- Install several additional groundwater wells.

b. **Waste Discharge Requirements (WDR)**

i. The Board adopted WDR Order No. 89-180 on December 13, 1989, requiring the Discharger to further characterize the Site and define the extent of subsurface contamination. This included detailing the Site geology,

investigating soil and groundwater quality at the Facility WMUs, and defining the extent of hydrocarbon contamination.

ii. On February 19, 1997, the Board adopted WDR Order No. 97-027, which required the Discharger to further investigate subsurface conditions at the Refinery, and develop the next phase of remediation. The implementation of the Order requirements ultimately included enhancing the Facility's groundwater containment systems.

iii. On June 15, 2005, the Board adopted WDR Order No. R2-2005-0026 to update the existing groundwater monitoring schedule and sampling parameters for the Facility. The objectives of the groundwater quality program are to:

- Enhance source control measures (e.g., aboveground tank bottom retrofits, enhanced tank inspections, etc.) to prevent future releases and degradation of groundwater quality;
- Monitor groundwater quality at the downgradient perimeter of the Refinery, interior WMUs and areas of concern, site surface impoundments, and active remediation systems;
- Hydraulically control groundwater quality near the downgradient perimeter of the Refinery through remediation systems;
- Remediation of contaminant source areas (hot spots) in the interior of the Refinery.

c. **National Pollutant Discharge Elimination System (NPDES) WDR**
The Board adopted Order No. R2-2005-0030 (NPDES No. CA0005053) in June 2005. This permit regulates the discharge of treated wastewater and stormwater runoff, and non-contact once through salt cooling waters from the Site.

6) Geology

The Refinery is located in the gently west-sloping valley floor and nearby upland areas associated with an east-west trending syncline. The axis of the syncline dips to the west towards San Pablo Bay, with the northern limb dipping almost vertically and the southern limb dipping at an approximately 35 degree angle. The general stratographic sequence of lithologic units underlying the Site include:

- Fill;
- Unconsolidated Bay Sediments (Bay Mud, Bay Sand, Older Bay Mud);
- Montezuma Formation
- Pinole Tuff and associated clastic sediments
- San Pablo Group bedrock units

The distribution of these units influences the occurrence of groundwater aquifers at the Facility. In some areas bay mud or bay sand are absent. There is also considerable spatial variation in the thickness of these units. An accurate understanding of the subsurface lithology is necessary for conducting subsurface investigations and for groundwater monitoring well and extraction well placement.

Fill, sourced from the historic development of the area, is present in many areas of the Refinery. The area it is most commonly encountered includes the Refinery's San Pablo Bay perimeter where the intertidal margins of the Bay were reclaimed and developed by the early Refinery and ranchers. It is also found in interior Refinery work areas where terraces for new structures were developed on the sloping topography, and along the margin of the Interstate I-80 highway viaduct

constructed in the 1950's. The fill is typically reworked sediments sourced from the other stratigraphic units found in the Refinery area, with some localized construction debris.

In the Bay Front Area of the Refinery, the fill is underlain by late Pleistocene to Holocene age Bay Sediments, that include a complex distribution of Bay Mud and Bay Sand determined by the environment that the sediments were deposited. The typical occurrence is approximately 10 feet of Bay Mud overlying a thicker accumulation of Bay Sand, and an underlying unit of older Bay Mud; however there are areas where these different units are absent. The Bay Muds are typically clay or silty clays with localized areas of partially decayed vegetation or peat. The lithology of the Bay Sand is spatially variable, and ranges from very fine sand or silt to medium or coarse sand. The coarsest Bay Sand has historically been that found in area of present day San Pablo Avenue. This area is interpreted to have been an elevated beach ridge prior to the building of the nearby railroad tracks and reclamation of the intertidal areas.

The Bay Sediments are believed to overlap onto the nearly flat lying Montezuma Formation in the area of San Pablo Avenue. The Montezuma Formation has been characterized as a series of estuarine and continental deposits, including poorly indurated pebbly gravels, sand, and silts. The Montezuma Formation outcrops along the Refinery access road that extends past the south side of the former PG&E Power Plant site, and at the small hill south of the Effluent Safety Basin and the Refinery property (Fig.3).

The remainder of the Refinery is comprised of bedrock associated with the Pliocene Pinole Tuff and underlying Miocene San Pablo Group. The units have been deformed and provide the structural basis of the aforementioned syncline. They range from andesitic tuffs of the Pinole tuff, to shales and sandstones of the Neroloy and Cierbo formations.

There are two important features that have geologic associations:

- There are two major buried valleys beneath the Bay Front area that include thicker accumulations of Bay Sediments. These two valleys are bayward extensions of buried drainages that generally followed the synclinal axis of the San Pablo Group. The larger one lies beneath the Primary and Main Storm Basins and extends underneath the Effluent Safety Basin (Fig.3). The other extends from just south of the former PG&E site toward the Effluent Safety Basin, where the two merge.
- The area bounded by current San Pablo Road, the railroad tracks, and the former PG&E Outfall Ditch was a low-lying embayment before the Railroad was constructed in the mid 1880's. The placement of the tracks spanned the intertidal area, and effectively cut it off from San Pablo Bay forming an interior wetland. The area was systematically developed during the first half of the 1900's with different episodes of fill that brought the area to grade.

7) Groundwater

Groundwater south of the former PG&E saltwater outfall ditch (Fig.4) occurs from six to ten feet above mean sea level along most areas of the Bay Front, with a gradient towards San Pablo Bay. There are two water-bearing zones near the Bay Front. The upper water table is referred to as the A-Zone, and the deeper water table is

referred to as the B-Zone. The A-Zone aquifer is primarily located in fill and in Bay Mud deposits, however it occurs in Bay Sand where the Bay Mud is absent. The lower B-Zone aquifer occurs below the Bay Mud in fine to very fine-grained Bay Sand deposits of variable thickness. The Bay Sand of the B-Zone becomes finer and less hydraulically conductive near the Bay Front.

The Refinery is not located within a state-designated groundwater basin, however two unofficial groundwater basins underlie (or partially underlie) the Site. The main groundwater basin, termed the Refinery Groundwater Basin for identification, includes the entire area south/southwest of Tormey Hill Ridge, including the Central Valley and Bay Front areas. The area typically has a groundwater gradient that follows topography, including southwest off Tormey Hill Ridge, and then northwest through the Central Valley toward San Pablo Bay. The smaller Tormey Groundwater Basin is the area located northeast of Tormey Hill Ridge extending down into Cañada de Cierbo. The basin has a northeast sloping groundwater gradient within the Refinery boundary toward the bottom of Cañada de Cierbo and the ephemeral creek present in portions of it. The Tormey basin underlies a small portion of the upper tank farm (Fig.2 and Fig.3).

8) Constituents of Concern (COCs)

The primary constituents of concern (COCs) at the Refinery include various types of petroleum hydrocarbons and metals. Petroleum hydrocarbons (crude oil as well as different types of refined products and their derivatives) occur in both the dissolved phase and as free product. Metals (antimony, arsenic, barium, cadmium, chromium, lead, mercury, nickel, vanadium) are also present in groundwater at the Site, with lead being the chief metal of concern. Volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and aromatic volatile organic compounds (AVOCs) have also been detected in groundwater at some locations within the Site.

9) Groundwater Monitoring and Extraction Areas

The Discharger is responsible for monitoring groundwater quality at active and inactive Waste Management Units (WMUs), several interior management locations, and the Site perimeter. Many of these monitoring sites are also undergoing corrective action measures (e.g., total fluids extraction) (see Table 2). Detailed descriptions of these monitoring and extraction areas are included in the Refinery's WDR Order No. R2-2005-0026.

10) Site Investigations

Environmental investigations at the Refinery began in the 1980's when the permitting status of the Land Treatment Area (LTA) and Primary and Main Storm Basins was first being regulated by the California Department of Health Services. The investigations at the LTA included four geologic and soil/groundwater assessment reports completed between 1982 and 1988 (Woodward Clyde [WCC] 1982; Brown & Caldwell [B&C] 1984, 1986, and 1988a), and ultimately a Post-Closure Plan (B&C, 1988b). A 10-year RCRA permit for the LTA was issued in June 1991. Investigations for the storm basins included the preparation of a Report of Waste Discharge in 1988 (Dames and Moore, 1988), and the Basins Report in (B&C, 1991), which ultimately led to a Resource Conservation Recovery Act (RCRA) operating permit for the Primary Storm Basin.

Site investigations were expanded at the Refinery under the RCRA assessment process begun in 1985, documented in a RCRA Facility Assessment Report (ATKearney, 1987), and formalized via the issuance of RCRA Administrative Order No. RCRA 09-89-0012 on February 24, 1989. The RCRA Order required investigation and as necessary, corrective action at Solid Waste Management Units (SWMUs) at the Refinery. The investigation/corrective action work at the SWMUs was documented in five reports completed between 1989 and 1992 (B&C 1989a, 1989b; and WCC 1990, 1992, 1994b).

The investigation/remediation of refinery-wide groundwater quality was begun in 1989 with the Board's issuance of WDR Order No. 89-180. This Order led to the completion of the Refinery-wide Hydrocarbon Investigation (WCC, 1992, 1993a). Groundwater programs and a plan for remedial control of the most heavily affected groundwater were developed and implemented between 1993 and 1996 (WCC, 1993b, 1994) in accordance with SCR Order No. 93-046; this work included the installation of the first 2400 feet of the Interceptor Trench (Montgomery Watson, 1995a) and downgrandient wells (Montgomery Watson, 1996a).

The investigation/remediation of Refinery groundwater has been continued since the installation of the Interceptor Trench in multiple phases of work. In 1995, a new waste site (WMU-6C) was identified (Montgomery Watson, 1995b), and between 1997 and 1999 in accordance with WDR Order No. 97-027, the Refinery performed new site investigations at several areas of interest (Montgomery Watson, 1996b, 1996c, 1997a, 1997b, 1998a). In addition, the Refinery augmented control of affected groundwater with four additional remedial systems (Montgomery Watson, 1997c, 1997d, 1998c, and 1999). Between 2000 and 2005, the Refinery has continued proactive investigation of areas of concern outside of remedial controls, including the Tank 100 (MWH, 2004), Marine Terminal (MWH, 2005), and E-003 areas.

A list of the key site documents / investigation reports is provided in Table 3.

11) Summary of Free Phase Liquid Hydrocarbon (FPLH) Recovery Program

Five operating systems control groundwater and/or recover FPLH within the San Francisco Refinery (Fig.5):

- Interceptor Trench
- B-Zone Extraction System
- Tank 302 Area Interceptor Trench and B-Zone Extraction System
- Primary and Main Storm Basin (PSB/MSB) Extraction System
- Unit 76 Active Skimmer FPLH Recovery System

These systems were implemented as part of the overall Groundwater Quality Management Program for the Refinery. The (1) Interceptor Trench, (2) B-Zone Extraction System, and (3) Tank 302 Area System hydraulically control groundwater near the downgradient perimeter of the Refinery. The PSB and MSB extraction system and Unit 76 Active Skimmer FPLH Recovery System mitigate interior "hot spots". The components and effectiveness of each operating system are discussed below.

a. **Interceptor Trench** (Fig.5)
The Interceptor Trench consists of five segments (A through E). It was designed to capture contaminated groundwater and FPLH within the A-Zone aquifer from migrating into the Bay. The trench is constructed along approximately 3000 feet of the property boundary near the present-day San Pablo Bay shoreline (Refinery Groundwater Basin Perimeter). The trench captures shallow groundwater along its length by keeping the water level in the trench approximately one to five feet below the regional groundwater level. The main portion of the trench (Segments "A" through "D") was built in 1994/1995 and brought online in 1996. These trench segments include 15 total fluids extraction sumps (S-1 through S-15) spaced at approximately 200-foot intervals. The trench segments are connected by a common effluent conveyance line that transfers collected fluids to a 250-gallon surge tank. Fluid in the tank is pumped in batches to a drop inlet connected to the Refinery's wastewater system, which is routed to the wastewater treatment facility. A fifth trench segment (Segment "E"), with five extraction sumps (ES-1 through ES-5) spaced at approximately 125-foot intervals, was built in 1998 in the Tank 302 Area. This trench segment is part of the Tank 302 Area Interceptor Trench described below.

b. **B-Zone Extraction System** (Fig.5)
In 1996 the Discharger conducted an investigation of B-Zone groundwater quality and evaluated the influence of the perimeter extraction trench between the PG&E Saltwater Outfall and the ESB. The investigation concluded the following:

- The A-Zone groundwater is hydraulically separated from the B-Zone groundwater, although the two to six foot aquitard is considered leaky.
- The perimeter extraction trench does not impart a significant hydraulic influence on B-Zone groundwater. B-Zone groundwater is not contained or collected by the A-Zone trench.
- Volatile and semi-volatile organic compounds have been detected in five B-Zone wells.
- Trace amounts (<0.03 feet) of free phase product were detected in two B-Zone wells.
- Groundwater modeling of the B-Zone indicated that extraction from the five existing B-Zone wells located between the "B" and "C" trench alignment will provide hydrodynamic containment and collection of pollutants.

Based on the results of the investigation, the Discharger installed a B-Zone extraction system that consists of six B-Zone extraction wells (MW-200 through MW-204, installed in early 1997, and MW-215, installed in Spring 2001) to hydraulically control off-site groundwater migration in the deeper water-bearing zone. The B-Zone Extraction System effluent is piped into the same conveyance line as the Interceptor Trench.

The B-Zone Extraction System controls groundwater in the Inactive WMU 5 and 8 Area, typically producing up to ten feet of drawdown in the extraction wells and one to three feet of drawdown in the upgradient monitoring wells.

During 2005, the combined Interceptor Trench and B-Zone Extraction System removed approximately 6.0 million gallons of total fluids, corresponding to an

average flowrate of 11.4 gallons per minute (gpm). Quarterly estimates of the percent FPLH in the total fluids have ranged from 0.3 to 0.8 percent.

c. **Tank 302 Area Interceptor Trench and B-Zone Extraction System** (Fig.5)
The Tank 302 system is an extension of the Interceptor Trench and B-Zone Extraction System. The system includes a 625-foot long interceptor trench segment (Segment E) with five extraction sumps (ES-1 through ES-5) and three B-Zone extraction wells (MW-212, MW-213, and MW-214). The Tank 302 system was installed during Summer 1998 and brought online in September 1998. During 2005, the system removed approximately 640,000 gallons of total fluids, corresponding to an average flowrate of 1.2 gpm. Estimates of the percent FPLH in the total fluids have ranged from approximately 0.4 to 0.6 percent.

The Tank 302 system induces groundwater capture in this area of the Site. Water levels in the shallow groundwater zone along the trench typically exhibit approximately one to four feet of drawdown, with groundwater flow beneath the majority of the area moving toward the trench. B-Zone groundwater drawdown is generally maintained in the desired range of two to ten feet, with groundwater flow toward each extraction well. When effective groundwater drawdown is maintained by the system, the Tank 302 Area trench and B-Zone extraction wells induce capture in the groundwater zones several hundred feet inland.

d. **Primary Storm Basin & Main Storm Basin (PSB/MSB) Interior Extraction System** (Fig.5)
The PSB/MSB Interior Extraction System is a total fluids recovery system designed to remove FPLH from the subsurface and hydraulically control the flow of groundwater from the area currently occupied by the wastewater treatment plant. The system includes extraction wells MW-205 through MW-210 located adjacent to the northwestern side of the MSB and MW-23 located adjacent to the western edge of the MSB. The system was installed during Fall Quarter 1997, and started operation in January 1998.

The PSB/MSB extraction system has historically been effective at removing hydrocarbon impacted groundwater and recovering FPLH. During 2005, the system removed approximately 8.2 million gallons of total fluids, corresponding to an average flowrate of 15.6 gpm. FPLH has historically been present in five of the seven extraction wells (MW-205 through MW-209). However, normal operation of the system routinely controls the FPLH in these wells, with thicknesses generally being maintained at a sheen or very thin accumulation. Estimates of the percent FPLH in the extracted fluids have historically ranged from 0.1 to 0.6 percent.

e. **Unit 76 Interior Active Skimmer System** (Fig.5)
The Unit 76 Interior Active Skimmer System was installed in October 1998 to recover FPLH in the vicinity of the gas blending unit. The system includes three wells (MW-132, MW-134, and MW-186) fitted with product-only skimmers and pneumatic double-diaphragm or bladder pumps. The effluent from the wells is conveyed to a 150-gallon recovery tank, which is purged twice per week by vacuum truck. The system typically maintains FPLH in the three wells to a thickness of less than three inches. Approximately 6,100 gallons of FPLH were removed by the system in 2005.

12) Surface Water and Groundwater Treatment

Surface water (stormwater) from the process areas of the Refinery and extracted groundwater are routed to the Refinery's wastewater treatment facility via the site's sewer system. Water that passes through the wastewater treatment facility is treated, then released at the refinery's deepwater outfall, which is regulated by the facility's NPDES permit.

Surface water runoff from (1) undeveloped areas of the refinery (non-process areas), (2) the salvage yard, (3) and portions of San Pablo Ave. residential Rodeo, and I-80, flows through a channel that passes around the southern edge of the wastewater treatment area. The channel merges with once-through, non-contact cooling water flowing through the ESB system, where it is routed to the E-003 outfall and discharged to San Pablo Bay (Fig.4). Water collected in the channel is separate from refinery stormwater.

13) Areas of Concern (AOCs)

a. **Discontinuities Between Interceptor Trench Segments** (Fig.4 and Fig.5)

i. **Segments E and A - Tank 302 / Former E-001 Areas** (Fig.4 and Fig.5)

Tank 302 Area

Interceptor Trench Segments E and A are located along the western edge of the Refinery, north of the Former PG&E Outfall Ditch. Trench Segment A is the northern-most segment of the original four interceptor trench segments, which were installed in 1994/1995 and brought online in 1996. The interceptor trench was constructed to control hydrocarbons along the Refinery's perimeter with San Pablo Bay. Segment E is a 625-foot long trench located immediately north of Segment A. Segment E was installed and brought online in 1998 for augmented control of perimeter groundwater quality after additional investigations in 1997 found dissolved-phase hydrocarbons and intermittent FPLH in the Tank 302 area. There is an approximately 150-foot wide physical discontinuity between Interceptor Trench Segments E and A, through which the Union Pacific Railroad's Oakland to Sacramento railroad tracks run. While the trench segments have historically been judged to be effective at controlling the discharge of hydrocarbons from shallow groundwater to San Pablo Bay, further assessment of the control of groundwater and FPLH in the Tank 302 Area at the trench discontinuity is warranted (see Task No. 2).

Former E-100 Area

The E-001 Discharge Line (Line) is a buried, 1940's era, 42-inch-diameter concrete pipe located in the Tank 302 area near the discontinuity between Interceptor Trench Segments E and A. The Line was historically used to carry cooling water from a Refinery process unit to the E-001 discharge point in San Pablo Bay. The Line was taken out of service in 2003 because FPLH occasionally became entrained in the cooling water flow and was transported to the Bay. Oil is believed to have entered the Line through cracks in pipe sections and/or segment connection joints. The FPLH appears to have mainly infiltrated the Line when the cooling water flow was reduced or stopped, and was typically flushed out to the Bay when flow was reinitiated. To address potential hydrocarbon discharge from the Line to the Bay, the

distal 100 feet of the Line was cemented closed and the connection upgradient of Sump 23 was redirected. Approximately 240 feet of the Line is located within the Tank 302 area, and another approximately 120 foot long segment extends under the Union Pacific railroad tracks.

The current configuration of the Line, including the cemented distal end and open main segment, has resulted in fluids (groundwater and FPLH) collecting in the open portion of the Line and backing up into Sump 23. The fluids at Sump 23 are a Refinery maintenance and housekeeping issue, requiring the use of vacuum trucks and/or absorbent pads. To more efficiently control fluids buildup in this area, the Discharger proposes installing a pumping system in the Line, and processing the extracted fluids through the existing Tank 302 Area extraction system.

ii. **Segments A and B – Abandoned PG&E Outfall Ditch** (Fig.4 and Fig.5)
Segments A and B of the Interceptor Trench have an approximately 60-foot discontinuity between them as they abut the land parcel that contains the Abandoned PG&E Outfall Ditch (Outfall Ditch). The Outfall Ditch extends northeast from the former PG&E Oleum Power Plant to San Pablo Bay on land originally owned by PG&E. PG&E shut down the Plant in June 1987, but continued to use the Outfall Ditch until 1992 to recycle San Pablo Bay water. The opening of the Outfall Ditch to San Pablo Bay was sealed using a concrete plug in 1994. The Refinery now owns the Outfall Ditch parcel as part of their purchase of the power plant property in 2002.

The Outfall Ditch is approximately 50 feet wide and 15 feet deep below ground surface (bgs). The base and walls of the Outfall Ditch are comprised predominantly of native sediments and fill, with the exception of the lower most section near the Refinery property boundary near the shoreline which is supported by timber retaining walls and sheetpiles. The condition of the timber retaining walls and sheet pile structures left in place appear to be deteriorating.

Since 1994, thin layers of FPLH have periodically accumulated in the lowest portions of the Outfall Ditch (between the fence-line and the perimeter road). Accumulated FPLH is interpreted to seep into the Outfall Ditch from the subsurface adjacent to the channel. While the interceptor trench is believed to control the migration of FPLH to San Pablo Bay, enhancements to the extraction system may be warranted to control FPLH present in the Outfall Ditch area (see Task No. 3).

iii. **Segments C and D – E-003 Discharge Area** (Fig.4 and Fig.5)
The E-003 Discharge Area is located west of San Pablo Avenue and east of the Union Pacific Railroad tracks. The E-003 Discharge Area includes the Effluent Safety Basin (ESB), Ditch 6, and E-003 Outfall Canal. Interceptor Trench segments C and D have an offset configuration in this area that reflects the orientation and location of these different features. The physical discontinuity is an approximately 90-foot-long, straight-line-distance that corresponds to the practicable width of the E-003 Outfall Canal. The trench segments are believed to control the overall shallow groundwater quality in the E-003 Discharge Area and its movement toward San Pablo Bay. However, the trench segments are not configured to control FPLH and

dissolved phase hydrocarbons along the upgradient edges of the ESB and the eastern sections of Ditch 6. Hydrocarbon impacted groundwater could therefore discharge to these features if the regular E-003 cooling water flows are reduced.

The regular flow through the E-003 Discharge Area is comprised of approximately 31 million gallons per day (MGD) of non-contact, once-through cooling water, and approximately 0.2 MGD of wastewater from the Steam Power Plant and Unit 240 demineralizer regeneration processes. FPLH and dissolved phase hydrocarbons are known to be present on top of shallow groundwater in the E-003 Discharge Area, including in sediments within the ESB. During times of low flow through the E-003 Discharge Area, hydrocarbon sheen and FPLH globules are more apparent and persistent.

Several different hydrocarbon pools have been identified in the E-003 Discharge Area that potentially contribute to the hydrocarbon sheen and/or globules, including: 1) beneath the parking lot north of the ESB, 2) along the southern most section of Ditch 6, 3) upgradient of the ESB toward the waste water treatment plan, and 4) east of the Outfall Canal. To control potential discharges to the ESB and Ditch 6, enhancements to the FPLH recovery system in between interceptor trench Segments C and D are needed (see Task No. 5).

iv. **Area between Segments B and C** (Fig.5)
Although Interceptor Trench segments B and C are not contiguous, they were constructed such that they each overlap the original 60-foot long pilot section of the Interceptor Trench and effectively provide a continuous hydraulic control system for groundwater in this area. The area between Segments B and C is therefore not considered an AOC.

b. **Groundwater Quality and Hydraulic Control at Northern Refinery Shoreline Perimeter – Marine Terminal Area** (Fig.4)
The northern perimeter of the Refinery is also known as the Marine Terminal Area (Fig.4). While several groundwater monitoring wells line the perimeter boundary in this area, the groundwater gradient is not controlled by extraction wells or interceptor trenches as it is along other sections of the western perimeter boundary with San Pablo Bay (Fig.5). Investigations have identified the presence of methyl tertiary-butyl ether (MTBE) and total petroleum hydrocarbons as diesel (TPH-d) in the Marine Terminal Area groundwater. The presence of groundwater contamination in close proximity to the shoreline necessitates the Discharger implement measures to prevent contaminated groundwater from discharging to San Pablo Bay (see Task No. 1).

An investigation was conducted during Summer 2004 to assess the extent of MTBE and petroleum hydrocarbons in the Marine Terminal Area groundwater. The study identified a plume of MTBE in groundwater near inactive Tank 103 (Fig.4), with a maximum concentration of 970 µg/L. The source of the MTBE appears to be fluids from Tank 103 and its ancillary piping. Tank 103 has been inactive since 1996, but was found to contain residual water that contains MTBE. The tank is out of service and isolated, but the fluids have not been removed. Additionally, dissolved hydrocarbons and FPLH are present in groundwater across much of the Marine Terminal Area. FPLH, measured as greater than one

foot in some areas, appears to be most concentrated in the area between the Marine Terminal roadway and Tank 103. A thin film of FPLH is also locally present in the area west of the Marine Terminal Roadway, potentially as far west as beyond well MW-150. The summary report recommended installation of a shallow groundwater/FPLH interceptor trench system, by extending the existing interceptor trench from the Tank 302 area through this portion of the Refinery (MWH, 2004a).

Low concentrations of MTBE and TPH have been detected in B-Zone groundwater monitoring wells (MW-177 and MW-179) located in the Marine Terminal Area. Although FPLH has not been detected in these wells, a more extensive assessment of the B-Zone water quality in the Marine Terminal Area is needed (see Task No. 1).

c. **Interior Petroleum Hydrocarbon Contamination Areas**

i. **Tank 100 Containment Block Area** (Fig.4)

Tank 100, located at the western perimeter of the Refinery, is the largest aboveground storage tank at the Site. It is used for the receipt of crude oil from oil tankers that dock at the Marine Terminal. Small amounts of FPLH currently seep out of the ground near the eastern wall of the Tank 100 containment berm. The seep occurs at two locations: 1) near the point where the fill/discharge pipeline for Tank 100 enters the tank block subsurface (sump area), and 2) approximately 120 feet south of the sump between the tank and eastern hill slope/berm. Pressure tests indicate that the fill/discharge line to Tank 100 is competent and not leaking. The source of the seep is also not believed to be Tank 100 itself, as there have been no integrity issues with the tank historically, and a new double tank bottom with interstitial space monitoring was installed in 2000.

A 2004 subsurface investigation did not find FPLH to be pervasive at the surface or in the subsurface of the tank block, and a source was not identified. However, groundwater was observed near ground surface at the base of the slope of the eastern containment berm, and the seeps are believed to occur where isolated "hot spots" of FPLH daylight during the wet season. Board approved remedial methods, including constructing a shallow groundwater interceptor trench to control FPLH seeps, were proposed in the October 2004 report "Investigation / Initial Mitigation of Hydrocarbon Seep, Tank 100 Containment Block Area". Implementation of remedial actions is pending (Task No. 10).

ii. **Tank 168 Containment Block Area** (Fig.4)

Tank 168, located near the center of the Refinery in the Lower Tank Farm Area, is used to store gasoline blendstock. In recent years, FPLH has been observed seeping out of sediments comprising the tank containment block floor near the eastern wall of the tank block, and at the point where the fill/discharge line enters the berm. The FPLH has typically been dark in color and of medium to high viscosity, similar to a crude oil or heavy-end distillate. There have been no integrity issues with Tank 168 historically, and a new double tank bottom with interstitial space monitoring was installed in 2002. Therefore, the source of the seep is not believed to be Tank 168 itself.

Additionally, FPLH has not been detected in monitoring well MW-135, which is located within the Tank 168 Containment Block.

FPLH is present in monitoring wells south, and downgradient of Tank 168, but the FPLH is gasoline range and believed to be associated with an overfill event at Tank 695 in early 1970's. FPLH is also known to exist in monitoring wells north, and upgradient of Tank 168, but it is not found in a pervasive, area-wide plume.

A subsurface investigation was performed in May 2005 to assess the extent of hydrocarbons in the Tank 168 Containment Block. The investigation did not find FPLH to be pervasive in the area of the seep, and suggested hydrocarbons in higher concentrations are limited to an approximately 20 by 10-foot area of soil adjacent to the southern containment block berm. An October 2005 report titled "Investigation / Initial Mitigation of Hydrocarbon Seep, Tank 168 Containment Block Area" included Board-approved remedial recommendations, including excavating impacted soil to bedrock. Implementation of mitigation actions is pending (Task No. 8).

d. **Existing Groundwater Extraction/Free Phase Liquid Hydrocarbon (FPLH) Recovery Systems**

i. **Unit 76 FPLH Recovery Program** (Fig.4 and Fig.5)
The Unit 76 FPLH pool is comprised of gasoline and blending constituents. The source of this plume is believed to be from a historic overfill of Tank 695 that occurred in the 1970's. The FPLH pool has historically been depicted as extending from the area surrounding Tank 695 to the corner of "K" Street and Road No. 4 (Fig.4), but is not completely delineated. An FPLH recovery system was installed in the Unit 76 Area as part of the overall FPLH Recovery Program and the Provisions of SCR Order No. 93-046 and WDR Order No. 97-027 (see Finding 5, *Regulatory History*). The system included the installation of passive skimmers in wells MW-182 and MW-187 in the summer quarter 1996, and active skimmers in wells MW-186, MW-132 and MW-134 in fall quarter 1998. The passive skimmers were removed from the wells after the fall quarter 2000 due to low FPLH recovery. Since start-up, the three-well active skimmer extraction system has removed approximately 30,000 gallons of FPLH, with a yearly range of 1,940 to 6,119 gallons and a yearly average of 3,752 gallons. Despite a decade of TPH extraction efforts, up to 3 feet of FPLH is still present in the wells included in the system. The effectiveness of the existing extraction must therefore be evaluated and enhancements to the system considered (Task No. 6).

ii. **PSB/MSB Area Groundwater Extraction System** (Fig.4 and Fig.5)
The Primary Storm Basin (PSB) and Main Storm Basin (MSB) Area is located along the east side of San Pablo Avenue in the southern portion of the Refinery near Unit 100 (Fig.5). A soil and groundwater investigation of the area was conducted in the summer of 1996 in response to FPLH observed seeping into the ephemeral drainage ditch on the western side of the MSB. The study identified FPLH in the upper water-bearing zone at the west end of the MSB and in the vicinity of well MW-23. An FPLH recovery system was installed in the PSB/MSB Area in the Summer and Fall 1997 as part of the overall FPLH Recovery Program and the Provisions of WDR Order No. 97-

027 (see Finding 5, *Regulatory History*). The recovery system included the installation of six extraction wells (MW-205 through MW-210R) located along the western end of the MSB and the conversion of well MW-23 (on the north side of the MSB near Tank 501) into an extraction well. The seven extraction wells remove total fluids and are designed to control groundwater flow and FPLH from seeping into the ephemeral drainage ditch. An evaluation of the PSB/MSB extraction system is needed to determine whether augmentations or expansions are necessary to further control FPLH in the Unit 100 area (Task No. 7).

iii. **Iron Precipitation in Extraction Systems** (Fig.5)
Iron precipitates in the effluent of the Tank 302 Area extraction system and portions of the Main Interceptor Trench extraction system. The iron precipitate clogs the systems and requires shutdowns and additional maintenance to clean the affected areas. The iron is believed to precipitate when the oxygen driving the pumps is released, increasing the level of dissolved oxygen in the groundwater. Filters have been installed on pump intakes to reduce the amount of iron precipitate entering conveyance lines. Oxygen Release Compound (ORC) socks have been installed in wells surrounding extraction wells to increase the oxygen concentration of groundwater to precipitate the iron in the formation. These methods have slowed the iron precipitate accumulation in wells, pumps, and conveyance lines, but have not remedied the issue (Task No. 9).

e. **Monitoring Network** (Fig.6)
The groundwater monitoring network at the Refinery currently includes 42 perimeter, 48 interior, and 13 AST monitoring wells that are regularly sampled or gauged, as described in the Refinery's Self-Monitoring Program, WDR No. R2-2005-0026. The perimeter wells, located along the northern and western boundaries, are used to monitor water quality along the Refinery's perimeter, while interior wells monitor water quality associated with waste management units or "hot spots". The AST monitoring program wells are gauged to assess tank condition. Sampling parameters and/or gauging frequency are designed to monitor for the presence of COCs based on historic land use, trends in water quality, or FPLH thickness data.

The well network has been damaged, changed, or deemed in need of augmentation in a number of cases over recent years, as summarized below:

- In early 2000's, Union Pacific expanded the railroad tracks on the north side of the Refinery, resulting in the abandonment of monitoring well MW-176 and limited access to MW-175;
- Groundwater flow direction at IWS-4 and an expanded location for IWS-6C indicates the need for revised downgradient monitoring wells configuration;
- Recent groundwater results from WMU-7 suggest the downgradient monitoring well network may need revision; and
- The location of the Tank 203 AST monitoring well needs to be closer to the tank.

Per Task No. 4 of this Order, the monitoring well locations and/or networks in these areas shall be re-evaluated.

14) Cleanup Sites Adjacent to Refinery Property (Fig.2)

There are three cleanup sites located north (downgradient) of the Refinery, adjacent to the property boundary. The Refinery's perimeter monitoring activities indicate that contaminants from these sites do not appear to have migrated onto the Refinery property. The adjacent cleanup sites include:

a. **Bulk Storage Terminal**

Wickland Oil Co. constructed the Selby Bulk Storage Terminal (Terminal) in 1980. The ConocoPhillips Refinery is located immediately west and upgradient of this site. Shore Terminal and Valero acquired the Terminal in 1998 and 2005 respectively. It includes an AST area, a loading rack, rail transfer area, and associated facilities. The Terminal is used to store gasoline, jet fuel, diesel, alkylate, reformate, butane, MTBE, light cycle oil, naptha, and ethanol. Both dissolved phase and separate-phase petroleum hydrocarbons have been detected in the soil and groundwater at the site. The Board adopted Site Cleanup Requirements (Order No. R2-2004-0064) for the Terminal on July 28, 2004, naming Wickland and Shore as dischargers responsible for its cleanup. Multiple releases have been documented at the site including releases of gasoline, MTBE, diesel, jet fuel, and reformate.

b. **Selby Slag Superfund Site**

The Selby Slag Superfund Site is the former location of a metal smelter and liquid sulfur dioxide plant which operated from 1872 until the mid 1970s. During smelter operations, mineral ores were processed to extract lead, gold, and silver. The smelting operation generated approximately 3.8 million cubic yards of slag that was deposited along the shoreline (Fig.2). Metals, including arsenic, cadmium, copper, lead, nickel, silver and zinc have been detected in the offshore sediments and onsite soils. Groundwater beneath the site may also be impacted. In addition, weathering of the slag has resulted in low pH soil conditions, contributing to the mobilization of metals. Petroleum hydrocarbons and MTBE, presumably from off-site sources, have been identified at the site. MTBE has been detected in the storm drain system and the former oxidation pond and both MTBE and petroleum hydrocarbons have been detected in groundwater. Interim remedial actions at Selby Slag, the last of which was completed in 2005, included treatment of acid-affected soil, dredging of offshore sediments, installation of storm drainage structures, closure of the wastewater pond, and capping the site. DTSC oversees remediation of this site.

c. **Kinder Morgan Hydrocarbon Pipeline**

In 1996, diesel fuel, gasoline, and methyl tertiary-butyl-ether (MTBE) were released from a leaking Kinder Morgan underground petroleum pipeline located along the eastern edge of the Selby Pond in Rodeo (Fig.2). The damaged section of the pipeline was removed and a new underground pipeline was installed in September 1996. Following the release, several investigations and remedial activities were conducted at the site. These include the removal of free phase petroleum hydrocarbons present on the surface of Selby Pond, the excavation and disposal of approximately 210 cubic yards of affected soil, and the removal and disposal of contaminated groundwater. Results of soil and groundwater investigations indicated that the highest concentrations of diesel, gasoline and MTBE were limited to an area approximately 100 by 200 feet, adjacent to the pond. In 2000, the USEPA required installation of six additional

monitoring wells. An evaluation of the data from investigations performed at the site between 1996 and April 2005 indicate that MTBE concentrations exceeding Water Board Environmental Screening Levels (ESLs) have been detected approximately 360 feet from the release point. MTBE concentrations exceeding the California MCLs have also been detected west of the Selby Pond. MTBE is the primary COC. The Water Board oversees remediation of this site.

15) Basin Plan and Resolutions

a. **San Francisco Bay Basin Plan**
The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) represents the Board's master water quality control planning document. Among other things, the Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

b. **State Board Resolution No. 68-16**
State Water Resources Control Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest level of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background shall be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives

c. **State Board Resolution No. 92-49**
State Water Resources Control Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under California Water Code Section 13304," establishes policies and procedures to be used by the Board when:
   i) Determining when a person is required to investigate, cleanup, or abate a discharge;
   ii) Concurring with a discharger's selection of cost-effective investigation and remedial measures;
   iii) Overseeing implementation of investigation and remedial measures; and
   iv) Determining schedules for investigation and remedial measures.

d. **Board Resolution No. 89-39**
The Basin Plan provides that all groundwaters are considered suitable, or potentially suitable, for municipal or domestic water supply (MUN) and that, in making any exceptions, the Board will consider the criteria referenced in Board Resolution No. 89-39, "Sources of Drinking Water", where:
   i) The total dissolved solids exceed 3,000 mg/l (5,000 μS/cm, electrical conductivity), and it is not reasonably expected by the Board that the groundwater could supply a public water system, or
   ii) There is contamination, either by natural processes or human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use using best management practices or best economically achievable treatment practices, or

iii) The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

e. **Basis for California Water Code Section 13304 Order**
The Discharger has caused or permitted, causes or permits, or threatens to cause or permit waste to be discharged or deposited where it is or probably will be discharged into waters of the State and creates or threatens to create a condition of contamination or nuisance.

16) Beneficial Uses of Groundwater and Surface Water

a. **Groundwater**
The Site does not lie with a state-designated groundwater basin. However, there are two minor groundwater basins that underlie (or partially underlie) the Site (Refinery Groundwater Basin and Tormey Groundwater Basin; see Finding No.7, *Groundwater*). The existing and potential beneficial uses identified for groundwater in these basins, according to the Basin Plan and historic water use in the area, include:
- Municipal and domestic water supply (MUN);
- Industrial process water supply (PROC);
- Industrial service water supply (IND); and
- Agricultural water supply (AGR).

b. **Surface Water**
The Site resides within the boundaries of the San Francisco Bay San Pablo surface water basin, as defined in the Basin Plan. The existing and potential beneficial uses identified for surface water in this basin, according to the Basin Plan, include:
- Ocean, commercial, and sport fishing (COMM);
- Esturine habitat (EST);
- Industrial service supply (IND);
- Fish migration (MIGR);
- Navigation (NAV);
- Preservation of rare and endangered species (RARE);
- Water contact recreation (REC-1);
- Noncontact water recreation (REC-2);
- Shellfish harvesting (SHELL);
- Fish spawning (SPWN); and
- Wildlife habitat (WILD).

17) California Environmental Quality Act (CEQA)

This action is an order to enforce the laws and regulations administered by the Board. As such, this action is categorically exempt from the provisions of CEQA pursuant to Section 15321 of the CEQA Guidelines.

18) Notification

The Board has notified the Discharger and all interested agencies and persons of its intent under California Water Code Section 13304 to prescribe site cleanup requirements for the discharge, and has provided them with an opportunity to submit their written comments.

19) Public Hearing

The Board, at a public meeting, heard and considered all comments pertaining to this discharge.

IT IS HEREBY ORDERED, pursuant to Section 13304 of the California Water Code, that the Discharger (or its agents, successors, or assigns) shall cleanup and abate the effects described in the above findings as follows:

PROHIBITIONS

1) The discharge of wastes or hazardous substances in a manner that will degrade water quality or adversely affect beneficial uses of waters of the State is prohibited.

2) Further significant migration of wastes or hazardous substances through surface or subsurface transport to waters of the State is prohibited.

3) As required by State Water Resources Control Board Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000001 for the Discharge of Storm Water Associated with Industrial Activities, the discharge of contaminant-impacted stormwater from the Site, including sediment, is prohibited.

4) Activities associated with the subsurface investigation and cleanup that will cause significant adverse migration of wastes or hazardous substances are prohibited.

5) The storage, handling, treatment, or disposal of polluted soil or groundwater shall not create a nuisance as defined in California Water Code Section 13050(m).

TASKS

ALL REQUIRED SUBMITTALS MUST BE ACCEPTABLE TO THE EXECUTIVE OFFICER (SEE PROVISION NO. 1 *COMPLIANCE*)

1) **Groundwater Quality and Control of Contaminant Migration along Northern Refinery Shoreline Perimeter - Marine Terminal Area (Fig.4)**

DELIVERABLES: **Final Site Investigation**
Remedial Action Plan
Implementation Schedule

COMPLIANCE DATE: **January 31, 2007**

The Discharger shall submit a Final Site Investigation based on the November 2004 "Summary Report - Marine Terminal Area Investigation" to complete the assessment of groundwater quality in the Marine Terminal Area (see Finding No. 13b). The report shall include a proposed Remedial Action Plan and Implementation Schedule to prevent the migration of dissolved and free-phase petroleum hydrocarbons and MTBE in the Marine Terminal Area shallow (A-Zone) and deep (B-Zone) groundwater aquifers to San Pablo Bay. The report shall include data supporting the Discharger's assessment of the lateral and vertical extent of contamination in

the area, as well as a detailed area map showing the lateral contaminant boundaries and proposed work areas.

2) **Groundwater Control and FPLH Recovery Between Interceptor Trench Segments E and A - Tank 302 Area/Former E-001 Area (Fig.4 and Fig.5)**

DELIVERABLES: **Evaluation**
Remedial Action Plan (as needed)
Implementation Schedule (as needed)

COMPLIANCE DATE: **January 31, 2007**

The Discharger shall submit an Evaluation of groundwater control and FPLH recovery in the area between Interceptor Trench Segments E and A (Tank 302 and Former E-001 Areas). The Evaluation shall include an analysis of the hydraulic control systems in place and groundwater flow patterns in the physical discontinuity between Interceptor Trench Segments E and A, including augmentations to fluids extraction in the E-001 area (see Finding No. 13a,i). As needed, the Discharger shall submit a proposed Remedial Action Plan and Implementation Schedule to control the potential discharge of hydrocarbon-impacted groundwater to San Pablo Bay.

3) **Groundwater Control and FPLH Recovery Between Interceptor Trench Segments A and B – Abandoned PG&E Outfall Ditch (Fig.4 and Fig.5)**

DELIVERABLES: **Evaluation**
Remedial Action Plan
Implementation Schedule

COMPLIANCE DATE: **February 28, 2007**

The Discharger shall evaluate the hydraulic control of groundwater and FPLH recovery in the area between Interceptor Trench Segments A and B (the physical discontinuity associated with the abandoned PG&E Outfall Ditch). The Discharger shall submit an Evaluation of findings and propose a Remedial Action Plan and Implementation Schedule to enhance hydraulic control in this area to eliminate, to the extent practicable, FPLH seeps to the Outfall Ditch (see Finding No. 13a,ii).

4) **Coverage of Monitoring Network (Fig.6)**

DELIVERABLES: **Evaluation**
Work Plan (if needed)
Implementation Schedule (if needed)

COMPLIANCE DATE: **February 28, 2007**

The Discharger shall submit an Evaluation of the deficiencies in the existing groundwater well monitoring network (see Finding No.13e). The Evaluation shall take into account historic wells that have been decommissioned and not replaced, the proximity of AOCs to the Refinery perimeter, and the proximity of adjacent off-site cleanup areas. Should deficiencies be identified in the Evaluation, the Discharger shall submit a Work Plan that includes an area map identifying proposed augmentations as well as an Implementation Schedule.

5) **Groundwater Control and FPLH Recovery in the E-003 Discharger Area (Between Interceptor Trench Segments C and D) (Fig.4 and Fig.5)**

DELIVERABLES: **Site Investigation**
Remedial Action Plan
Implementation Schedule

COMPLIANCE DATE: **October 31, 2007**

The Discharger shall submit a Site Investigation to assess groundwater quality in the E-003 Discharge Area (see Finding No. 13a,iii). The Discharger shall propose a Remedial Action Plan and Implementation Schedule to enhance the hydraulic control of groundwater and removal of FPLH in this area, with the intent of improving control of discharges through the E-003 system. The report shall include data supporting the Discharger's assessment of the lateral and vertical extent of contamination in the area, as well as a detailed area map showing the lateral contaminant boundaries and proposed work areas.

6) **Effectiveness of Groundwater Extraction and FPLH Recovery System - Unit 76 Extraction System (Fig.4 and Fig.5)**

DELIVERABLES: **Site Investigation**
Remedial Action Plan (as needed)
Implementation Schedule (as needed)

COMPLIANCE DATE: **June 30, 2007**

The Discharger shall submit a Site Investigation to evaluate the effectiveness of the Unit 76 groundwater extraction and FPLH recovery system (see Finding No. 13d,i). The report shall include a proposed Remedial Action Plan and Implementation Schedule for possible system improvements and/or expansions that will expedite the removal of FPLH in the Unit 76 Area and improve overall groundwater quality.

7) **Effectiveness of Groundwater Extraction and FPLH Recovery System – Primary Storm Basin /Main Storm Basin (PSB/MSB) Area Extraction System (Figs 4 & 5)**

DELIVERABLES: **Site Investigation**
Remedial Action Plan (as needed)
Implementation Schedule (as needed)

COMPLIANCE DATE: **June 30, 2007**

The Discharger shall submit a Site Investigation to evaluate the effectiveness of the PSB/MSB Area groundwater extraction and FPLH recovery system (see Finding No. 13d,ii). The report shall include a proposed Remedial Action Plan and Implementation Schedule for possible system improvements and/or expansions that will enhance hydraulic control of groundwater in the area and improve FPLH recovery.

8) **Groundwater Quality and FPLH Seeps - Tank 168 Containment Block Area (Fig.4)**

DELIVERABLE: **Remedial Action Completion Report**

COMPLIANCE DATE: **July 31, 2007**

The Discharger shall submit a Remedial Action Completion Report that (1) details the work done to implement recommendations presented in the October 2005 report "Investigation / Initial Mitigation of Hydrocarbon Seep, Tank 168 Containment Block Area" and (2) includes data supporting the Discharger's assessment of the lateral and vertical extent of hydrocarbon contamination in the area. The proposed remediation entails excavating hydrocarbon-impacted soil down to bedrock and backfilling with clean soil. The Remedial Action Completion Report shall also include a detailed area map showing the excavation areas and sampling locations. Approved excavation specifications are described in the October 2005 Investigation.

9) **Effectiveness of Groundwater Extraction and FPLH Recovery System - Iron Precipitation in Tank 302/Interceptor Trench Systems (Fig.4)**

DELIVERABLES: **Feasibility Study**
Remedial Action Plan (as needed)
Implementation Schedule (as needed)

COMPLIANCE DATE: **October 01, 2007**

The Discharger shall submit a Feasibility Study to evaluate engineering alternatives to control iron precipitation and to alleviate system downtime in extraction wells in the Tank 302 Area and Main Interceptor Trench groundwater extraction systems (see Finding No. 13d,iii). The report shall include a proposed Remedial Action Plan (as feasible) and Implementation Schedule.

10) **Groundwater Quality and FPLH Seeps - Tank 100 Containment Block Area (Fig.4)**

DELIVERABLES: **Remedial Action Completion Report**

COMPLIANCE DATE: **February 01, 2008**

The Discharger shall submit a Remedial Action Completion Report that (1) details the work done to implement recommendations presented in the October 2004 report "Investigation / Initial Mitigation of Hydrocarbon Seep, Tank 100 Containment Block Area" and (2) includes data demonstrating the recovery system is functioning as intended. The proposed remedial action entails constructing a shallow groundwater interceptor trench to replace current efforts to manually recover hydrocarbon. Approved interceptor trench specifications are described in the October 2004 Investigation.

11) **Update Groundwater Self-Monitoring Program**

COMPLIANCE DATE: **30 Days After Implementation of Task**

Following implementation of each task described above (Tasks 1 through 10), the Discharger shall review WDR Order No. R2-2005-0026 Self-Monitoring Program and propose any necessary updates to incorporate new groundwater monitoring

wells, extraction systems, and/or sampling parameters. All sampling protocols and reporting requirements shall be consistent with those described in WDR Order No. R2-2005-0026 (see Attachment A).

PROVISIONS

1) **Compliance**
The Discharger shall comply immediately, or as prescribed by the time schedule below, with all Prohibitions, Specifications, and Provisions of this Order. All required submittals must be acceptable to the Executive Officer. The Discharger must also comply with all conditions of these Site Cleanup Requirements. Violations may result in enforcement actions, including Water Board Orders or court Orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of this Order by the Board. [CWC Section 13261, 13262, 13265, 13267, 13268, 13300, 13300, 13301, 13304, 13350].

2) **Authority to Request Technical Reports**
All technical and monitoring reports required by this Order are requested pursuant to Section 13267 of the CWC. Failure to submit reports in accordance with schedules established by this Order or failure to submit a report of sufficient technical quality to be acceptable to the Executive Officer may subject the Discharger to enforcement action pursuant to Section 13268 of the CWC.

3) **Modifications to Remedial Action Plan**
The Discharger shall notify the Executive Officer at least 60 days prior to proposed major modifications to any approved Remedial Action Plan, Implementation Schedule, or remediation system. The notification shall include the rationale for any proposed modification.

4) **Delayed Compliance**
If the Discharger is delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the required Tasks, the Discharger shall promptly notify the Executive Officer of the delay and reason for the delay and the Board may consider revisions to this Order.

5) **Operation and Maintenance (O&M)**
The Discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this order. [CWC Section 13263(f)]

6) Availability

A copy of these site cleanup requirements shall be maintained by the Discharger and shall be made available by the Discharger to all employees or contractors performing work necessary to comply with the Tasks set forth in this Order. [CWC Section 13263]

7) Change in Ownership

In the event of any change in control or ownership of the facility presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be forwarded to the Board upon a final change in ownership.

To assume operation of this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of this Order within 30 days of the change of ownership. The request must contain the requesting entity's full legal name, mailing address, electronic address, and telephone number of the persons responsible for contact with the Board. Failure to submit the request shall be considered a discharge without requirements, a violation of the CWC. [CWC Sections 13267 and 13263]

Due Date: 30 days after a change in facility control or ownership

8) Stormwater

The Discharger shall comply with the State's General Stormwater Permits for both industrial activities and construction activities (currently Order Numbers 97-03-DWQ and 99-08-DWQ, respectively).

9) Reporting Hazardous Substance Release

Except for a discharge which is in compliance with adopted waste discharge requirements, any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, shall immediately notify the Office of Emergency Services (OES) of the discharge in accordance with the spill reporting provision of the state toxic disaster contingency plan adopted pursuant to Article 3.7 (commencing with Section 8574.7) of Chapter 7 of Division 1 of Title 2 of the Government Code, and immediately notify the Board of the discharge as soon as:

a. That person has knowledge of the discharge;
b. Notification is possible; and
c. Notification can be provided without substantially impeding cleanup or other emergency measures.

This provision does not require reporting of any discharge of less than a reportable quantity as provided for under subdivisions (f) and (g) of Section 13271 of the Water Code unless the Discharger is in violation of a prohibition in the applicable water Quality Control Plan. [CWC Section 13271(a)]

A written report shall be filed with the Board within five working days. The report shall include the following components:

i. Nature of the waste or pollutant;
ii. Estimate of the quantity involved;
iii. Cause of the release;

iv. Duration of incident;
v. Estimated size of affected area;
vi. Corrective measures that have been taken or planned, and a schedule of these measures;
vii. Nature of effects (e.g., pertinent observations, analyses, etc.);
viii. Persons/agencies notified;
ix. Map showing the location(s) of any spill, seepage, or dike rupture;
x. Photographs of the impacted area;
xi. A copy of the OES notification report.

10) Contractor/Consultant Qualifications

All technical documents shall be signed by and stamped with the seal of a California professional geologist, a California certified professional geologist or hydrogeologist, or a California registered civil engineer.

11) Lab Qualifications

All samples shall be analyzed by State-certified laboratories or laboratories accepted by the Board using approved EPA methods for the type of analysis to be performed. All laboratories shall maintain quality assurance/quality control (QA/QC) records for Board review. This provision does not apply to analyses that can only reasonably be performed on-site (e.g., temperature).

12) Document Distribution

Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following entities:

a) The Board, and
b) The Department of Toxic Substances Control.

The Executive Officer may modify this distribution list as needed.

13) Submittal Revisions

Where a Discharger becomes aware that it failed to submit any relevant facts in a report or submitted incorrect information in any report to the Board, it shall promptly submit such facts or information. [CWC Sections 13260 and 13267]

14) Severability

Provisions of these site cleanup requirements are severable. If any provisions of these requirements are found invalid, the remainder of these requirements shall not be affected. [CWC 9213]

15) Electronic Reporting

Geotracker Requirements

The State Board has adopted regulations requiring electronic report and data submittal to Geotracker. The text of the regulations can be found at the following website address:

http://www.waterboards.ca.gov/ust/cleanup/electronic_reporting/docs/final_electronic_regs_dec04.pdf

Starting July 1, 2005, parties responsible for cleanup of pollution at sites overseen by the Board's Spills, Leaks, Investigations, and Cleanup Program (SLIC) are required to submit over the internet, the following information electronically:

i) Groundwater analytical data;
ii) Surveyed locations of monitoring wells;
iii) Boring logs describing monitoring well construction; and

iv) Portable data format (PDF) copies of all reports (the document, in its entirety [signature pages, text, figures, tables, etc.] shall be saved as a single PDF file).

Note that the Discharger is still responsible for submitting one hard copy of all reports pursuant to this Order. Individual Water Boards may require direct submittal of electronic reports and correspondence in addition to the State Board's Geotracker requirements.

16) Access to Site and Records

The Discharger shall allow the Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:

a. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Order;
b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this Order;
c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this Order or as otherwise authorized by the CWC, any substances or parameters at any location. [CWC Section 13267]

17) Maintenance of Records

The Discharger shall retain records of all monitoring information including all calibration and maintenance records, all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this Order, and records of all data used to complete the application for this Order. Records shall be maintained for a minimum of five years from the date of the sample, measurement, report, or application. This period may be extended during the course of any unresolved litigation regarding this discharge or when requested by the Executive Officer.

Records of monitoring information shall include:

a. The date, exact place, and time of sampling or measurements;
b. The individuals who performed the sampling or measurements;
c. The date(s) analyses were performed;
d. The individuals who performed the analyses;
e. The analytical techniques or method used; and
f. The results of such analyses.

18) Report Certification

All application reports or information to be submitted to the Executive Officer shall be signed and certified as follows:

- For a corporation – by a principal Executive Officer or the level of vice president.
- For a partnership or sole proprietorship – by a general partner or the proprietor, respectively.
- For a municipality, state, federal, or other public agency – by either a principal Executive Officer or ranking elected official.

A duly authorized representative of a person designated in this provision may sign documents if all of the following are met:

a. The authorization is made in writing by a person described in paragraph (a) of this provision;
b. The authorization specifies either an individual or position having responsibility for the overall operation of the regulated facility or activity; and
c. The written authorization is submitted to the Executive Officer.

Any person signing a document under this Section shall make the following certification:
"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment." [CWC Sections 13263, 13267, and 13268]

19) Cost Recovery

The Discharger (as applicable) shall be liable, pursuant to California Water Code Section 13304 and Health and Safety Code Section 25270.9 to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial action, required by this Order. If the Site addressed by this Order is enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to the procedures established in that program. Any disputes raised by the Discharger (as applicable) over reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures for that program.

20) Periodic Site Cleanup Requirements (SCR) Order Review

The Board will review this Order periodically and may revise it when necessary. The Discharger (as applicable) may request revisions and upon review the Executive Officer may recommend that the Board revise these requirements.

21) Rescind Site Cleanup Requirements Order No. 93-046

This Order supersedes and rescinds SCR Order No. 93-046.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 11, 2006.

Bruce H. Wolfe
Executive Officer

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FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO: IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIEF OR CIVIL OR CRIMINAL LIABILITY

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Attachments:
- Figure 1. Site Location
- Figure 2. Site Aerial Map
- Figure 3. Site Plan Showing Surface Impoundments, Inactive Waste Management Units, and Effluent Safety Basin
- Figure 4. Areas of Concern
- Figure 5. Hydrocarbon Remediation Systems
- Figure 6. Perimeter Monitoring Well Network
- Table 3. Key Site Investigations
- Table 4. Technical Report Due Dates

Figure 1. Site Location
(figure based on "Vicinity Map" from MWH Site Monitoring Reports)

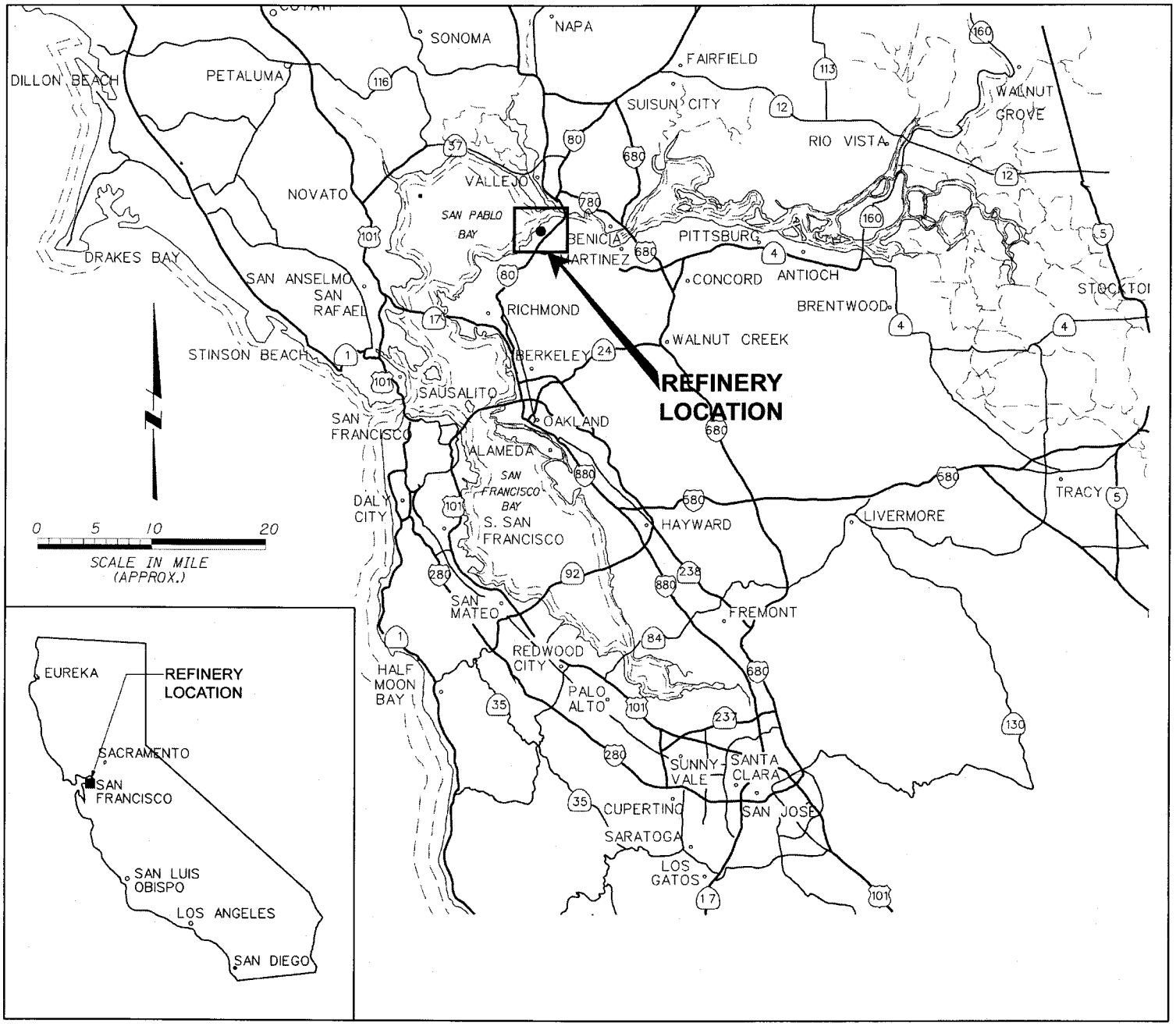

Figure 2. Site Aerial Map (aerial map based on ConocoPhillips meeting handout; topographic map based on figure from TOPO! program)

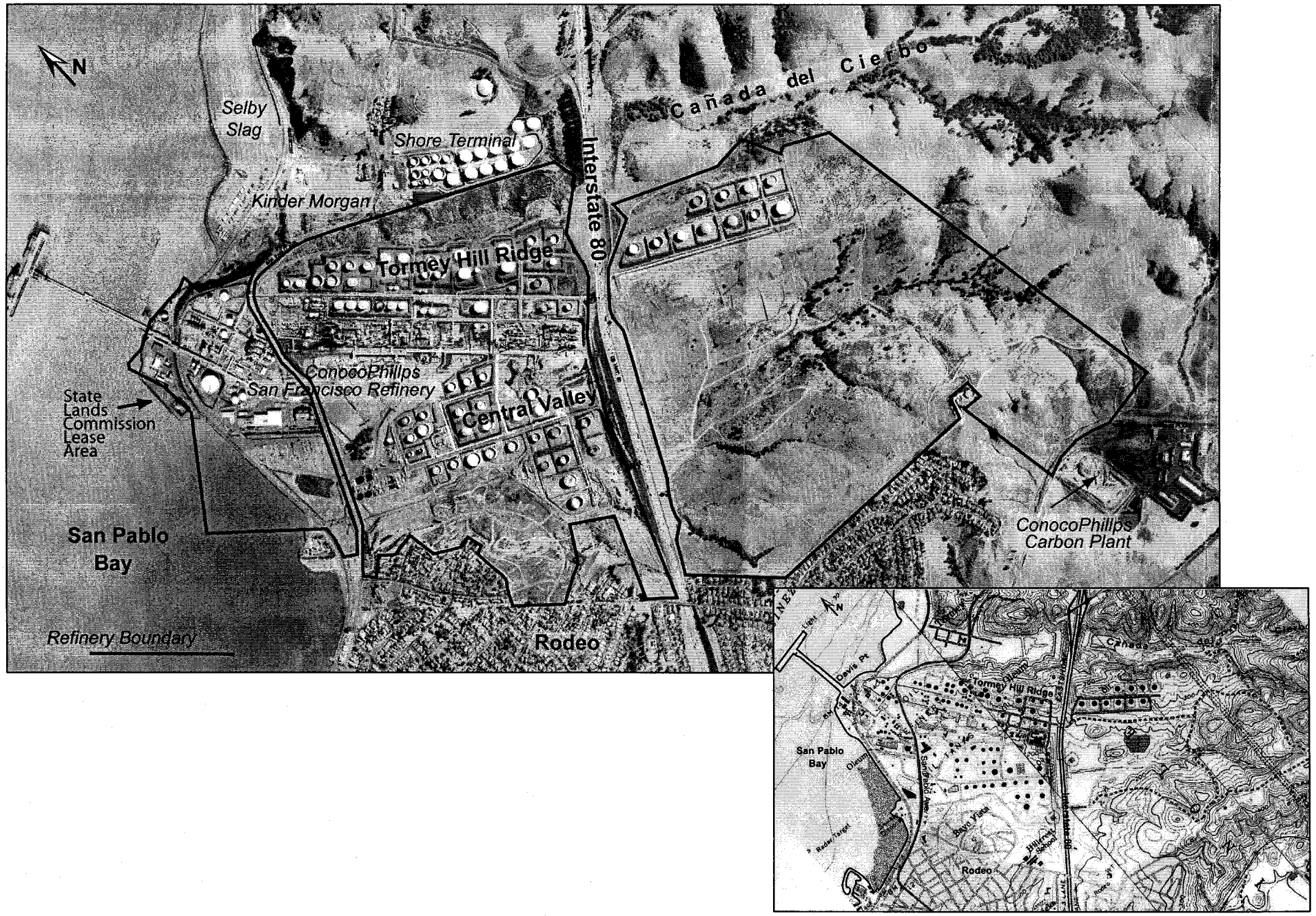

Figure 3. Site Plan Showing Surface Impoundments, Inactive Waste Management Units (WMU), and Effluent Safety Basin
(figure based on "Site Plan" map from MWH Site Monitoring Reports)

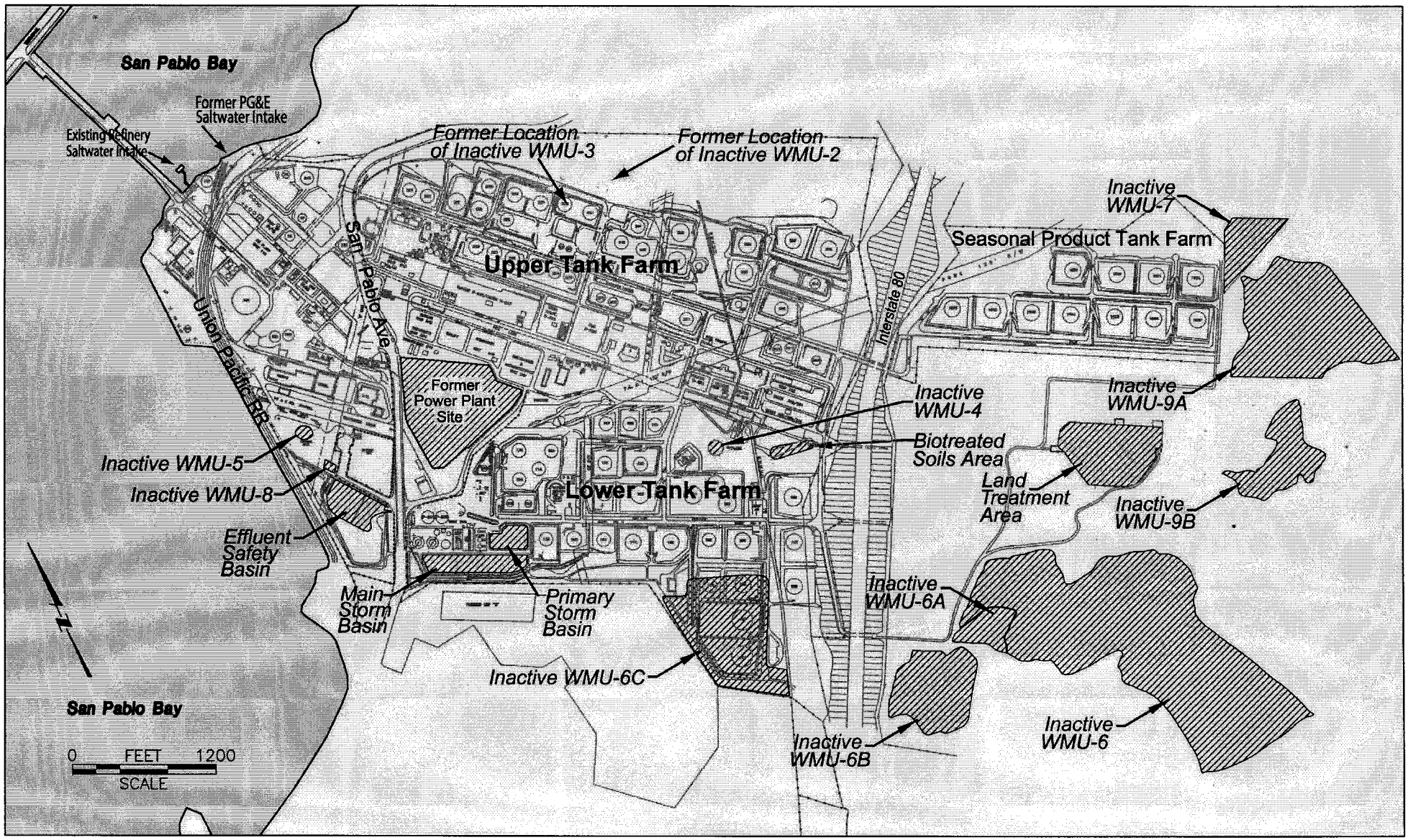

Figure 4. Areas of Concern (figure based on "Site Plan" map from MWH Site Monitoring Reports)

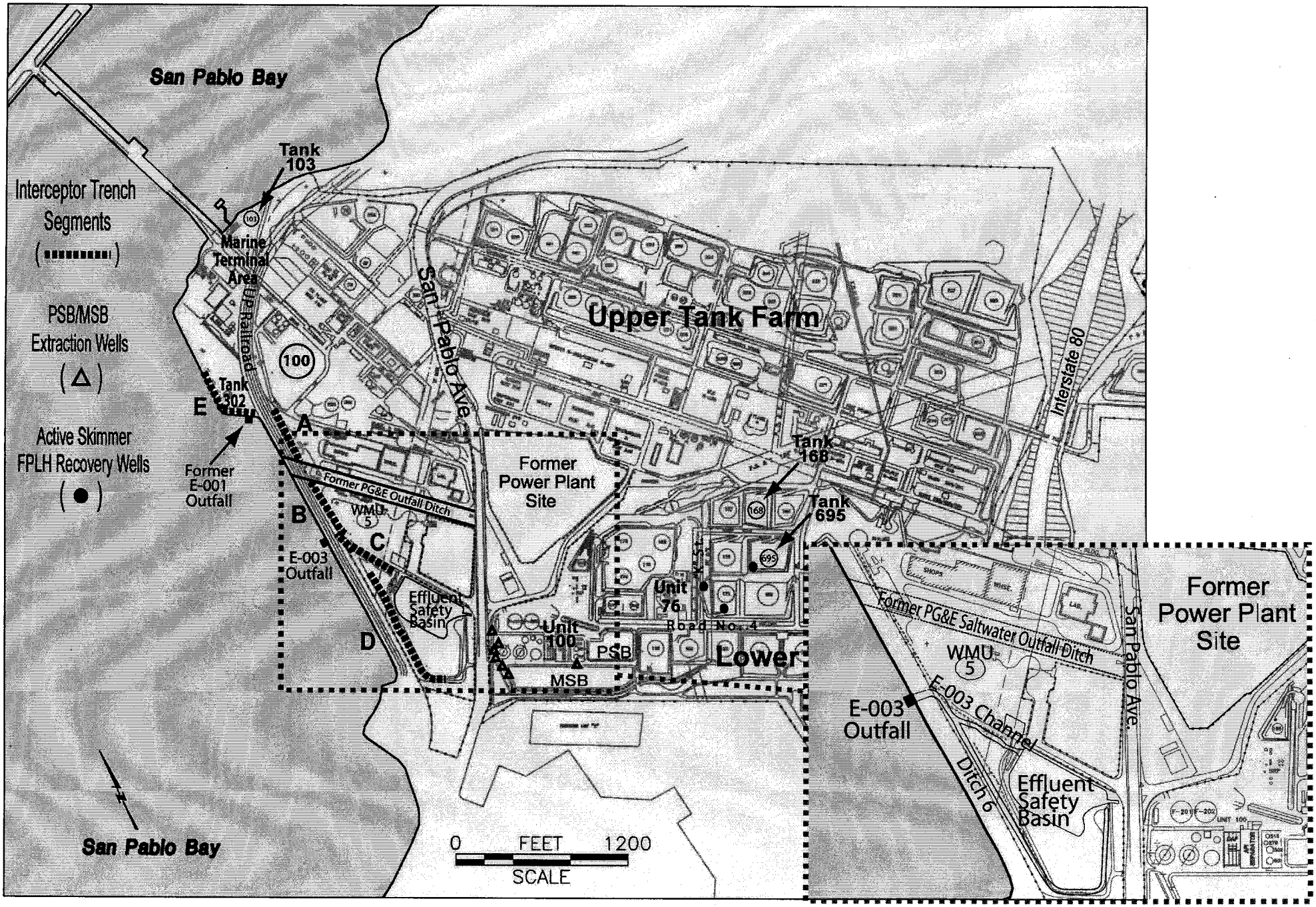

Figure 5. Hydrocarbon Remediation Systems (figure based on "Site Plan" map from MWH Site Monitoring Reports)

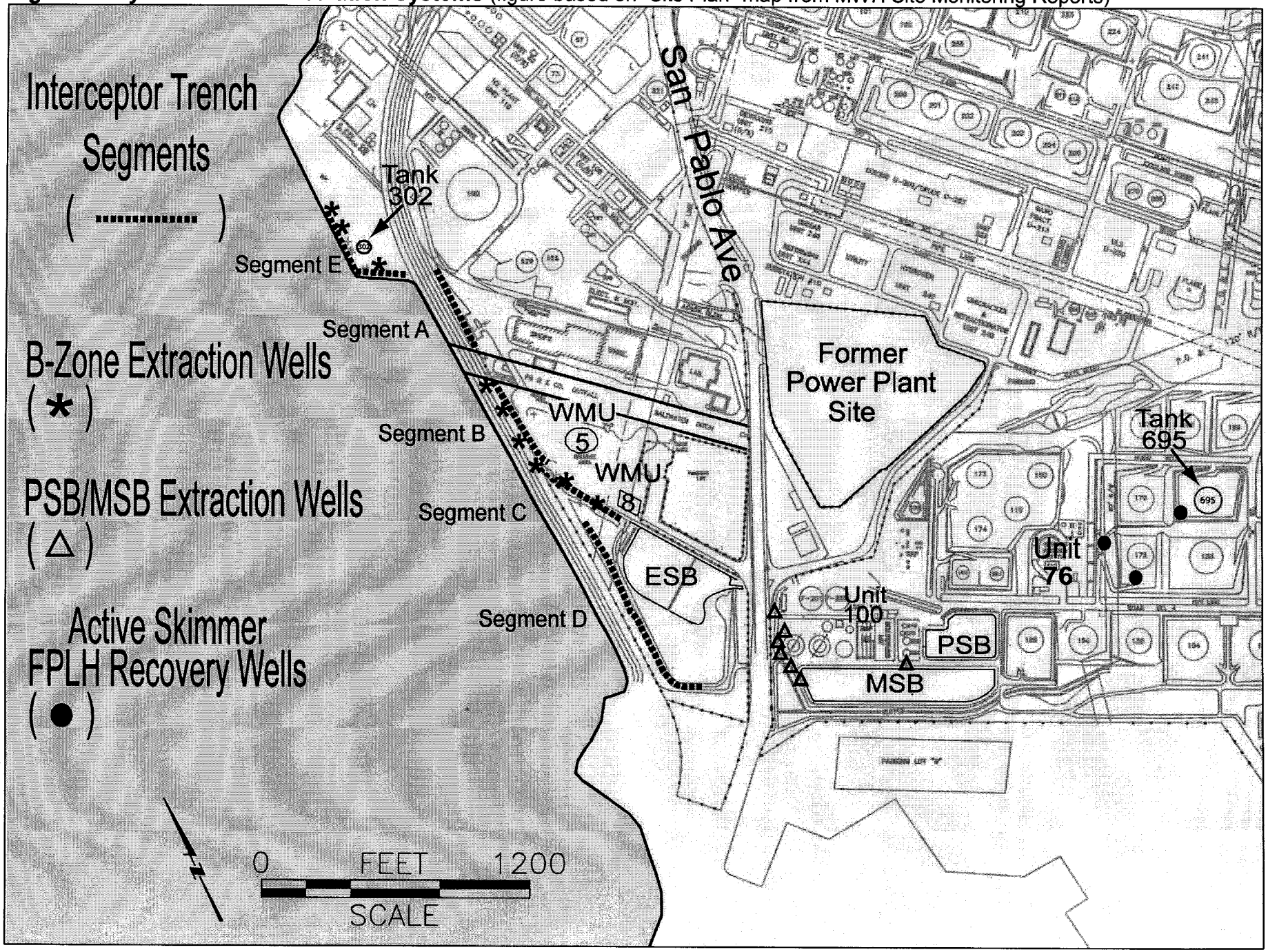

Figure 6. Perimeter Monitoring Wells (figure based on "Site Plan" map from MWH Site Monitoring Reports)

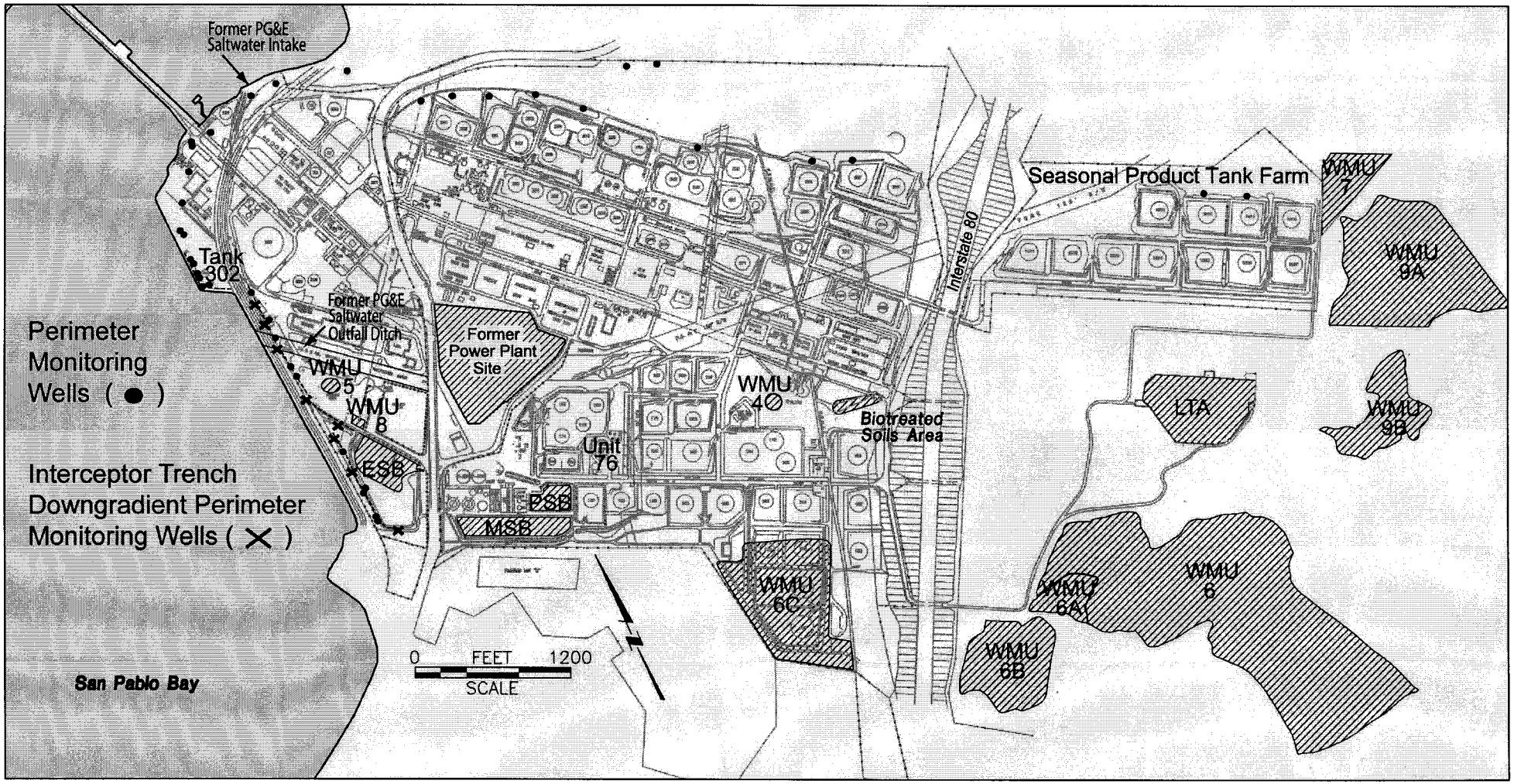

Table 2. Groundwater Monitoring and Extraction Areas

Site	Description	Location	Currently in Remedial Action	Included in SCR	Figure
Primary Storm Basin	Surface Impoundment	southwest corner	Yes	No	3
Main Storm Basin	Surface Impoundment	southwest corner	Yes	No	3
WMU-4	Inactive WMU	central	No	Yes	3
WMU-5	Inactive WMU	west shoreline	Yes	No	3
WMU-6	Inactive WMU	southeast corner	No	No	3
WMU-6A	Inactive WMU	southeast	No	No	3
WMU-6B	Inactive WMU	southeast	No	No	3
WMU-6C	Inactive WMU	south central	No	Yes	3
WMU-7	Inactive WMU	east corner	No	Yes	3
WMU-8	Inactive WMU	west shoreline	Yes	No	3
WMU-9A	Inactive WMU	east perimeter	No	No	3
WMU-9B	Inactive WMU	east perimeter	No	No	3
Land Treatment Area	Inactive WMU	east central	No	No	3
Effluent Safety Basin / E003 Channel	WDR Area of Concern	southwest corner	No	Yes	4
Unit 100 Wastewater Treatment Facility	WDR Area of Concern	southwest corner	Yes	No	4
Former PG&E Intake	WDR Area of Concern	northwest shoreline	Yes	No	3
Former PG&E Outfall	WDR Area of Concern	west shoreline	Yes	Yes	3
Gas Blending Unit 76	WDR Area of Concern	south central	Yes	No	4
Tank 302 / Well 181	WDR Area of Concern	northwest shoreline	Yes	No	4
Former PG&E Power Plant	Interior	west central	No	No	3
Primary and Main Storm Basin Extr. System	Interior Extraction	southwest corner	Yes	Yes	5
Unit 76 Active Skimmer	Interior Extraction	south central	Yes	Yes	5
Extraction Trench	Perimeter Extraction	west shoreline	Yes	Yes	5
B-Zone Extraction System	Perimeter Extraction	west shoreline	Yes	Yes	5
Tank 302 Area Interceptor Trench and B-Zone Extr. System	Perimeter Extraction	northwest shoreline	Yes	Yes	5
Perimeter Monitoring Wells	Perimeter	north and west perimeter	Yes	Yes	6

Table 3. Key Site Investigations

	Date	Report Title
1	1982 Dec	Hydrogeologic Investigation at the Union Oil Company of California Land Treatment Facility. *(Woodward-Clyde Consultants [WCC], 1982)*
2	1984 May	Geohydrologic Investigation at the San Francisco Refinery Land Farm. *(Brown and Caldwell [B&C[, 1984)*
3	1986 Aug	Groundwater Quality Assessment Report of Land Treatment Area. *(B&C, 1986)*
4	1987 Mar	RCRA Facility Assessment. *(AT Kearney, 1987)*
5	1988 Jan	Report of Waste Discharge for Primary and Main Storm Basins. *(Dames and Moore, 1988)*
6	1988 Mar	Additional Hydrogeologic Investigation of Land Treatment Area. *(B&C, 1988a)*
7	1988 Apr	Closure and Post-Closure Plan, Land Treatment Area. *(B&C, 1988b)*
8	1989 Jan	Report of Additional Investigation of Old Hazardous Waste Disposal Sites 2 and 3. *(B&C, 1989a)*
9	1989 Feb	Report of SWAT Investigation, Old Hazardous Waste Disposal Sites 4, 5, 6, 7, and 8. *(B&C, 1989b)*
10	1990 Nov	Reconnaissance Evaluation of the Areal Extent of Inactive Waste Sites in the Southeastern Part of Unocal's San Francisco Refinery. *(WCC, 1990)*
11	1991 Oct	Basins Report. *(B&C, 1991)*
12	1992 Apr	Inactive Waste Sites Report. *(WCC, 1992a)*
13	1992 Sep	Hydrocarbon Investigation Report, Revised Draft. *(WCC, 1992b)*
14	1993 Sep	Addendum to Inactive Waste Sites and Hydrocarbon Investigation Reports. *(WCC, 1993a)*
15	1993 Dec	Corrective Measures Study. *(WCC, 1993b)*
16	1994 Oct	Status Report on the Investigation of the PG&E Cooling Water Tunnel. *(Montgomery Watson, 1994a)*
17	1994 Oct	Phase II Ecological Risk Assessment. *(Montgomery Watson, 1994b)*
18	1995 Feb	As Built Construction Report for ICM Interceptor Trench. *(Montgomery Watson, 1995a)*
19	1995 Dec	Reconnaissance Evaluation of Arial Extent of Former IWS 6C. *(Montgomery Watson, 1995b)*
20	1996 Jan	Summary Report – ICM Interceptor Trench Downgradient A-Zone Well Installation Program. *(Montgomery Watson, 1996a)*
21	1996 Apr	FPLH Baseline Assessment, Investigation, and Recovery Work Plan. *(Montgomery Watson, 1996b)*
22	1996 Jul	Summary Report – B-Zone Groundwater Evaluation. *(Montgomery Watson, 1996c)*
23	1997 Jan	FPLH Investigations in the Vicinities of Tank 302 and the Main Storm Basin. *(Montgomery Watson, 1997a)*

24	1997 Aug	Results of Additional Investigation at IWS-6C. *(Montgomery Watson, 1997b)*
25	1997 Sep	Control and Removal of FPLH at PG&E Saltwater Intake Structure & Outfall Ditch. *(Montgomery Watson, 1997c)*
26	1997 Oct	B-Zone Groundwater Extraction System Start-up Report. *(Montgomery Watson, 1997d)*
27	1998 Jan	Addendum to Results of Additional Investigation and Remediation Plan – IWS-6C. *(Montgomery Watson, 1998a)*
28	1998 Oct	Groundwater Quality Monitoring Program. *(Montgomery Watson, 1998b)*
29	1998 Dec	Tank 302 Area Interceptor Trench and B-Zone Extraction System Construction and Start-up Report. *(Montgomery Watson, 1998c)*
30	1999 Jan	PSB and MSB Groundwater Extraction System Start-up Report. *(Montgomery Watson, 1999)*
31	2004 Oct	Tank 100 Seep Investigation. *(MWH, 2004)*
32	2005 Nov	Marine Terminal Investigation. *(MWH, 2005)*

B&C: Brown and Caldwell
D&M: Dames and Moore

Table 4. Technical Report Due Dates

	Required Submittals	Due Date
1	Groundwater Quality and Control of Contaminant Migration along Northern Refinery Shoreline Perimeter – Marine Terminal Area **Final Site Investigation; RAP; Implementation Schedule**	Jan 31, 2007
2	Groundwater Control and FPLH Recovery Between Interceptor Trench Segments E and A – Tank 302 Area **Evaluation; RAP (as needed); Implementation Schedule (as needed)**	Jan 31, 2007
3	Groundwater Control and FPLH Recovery Between Interceptor Trench Segments A and B – Abandoned PG&E Outfall Ditch **Evaluation; RAP; Implementation Schedule**	Feb 28,2007
4	Coverage of Monitoring Network **Evaluation; Work Plan (as needed); Implementation Schedule (as needed)**	Feb 28, 2007
5	Groundwater Control and FPLH Recovery in the E-003 Discharge Area (Between Interceptor Trench Segments C and D) **Site Investigation; RAP; Implementation Schedule**	Oct 31, 2007
6	Effectiveness of Groundwater Extraction and FPLH Recovery System – Unit 76 Extraction System **Site Investigation; RAP (as needed); Implementation Schedule (as needed)**	June 30, 2007
7	Effectiveness of Groundwater Extraction and FPLH Recovery System – PSB/MSB Area Extraction System **Site Investigation; RAP (as needed); Implementation Schedule (as needed)**	June 30, 2007
8	Groundwater Quality and FPLH Seeps – Tank 168 Containment Block Area **Remedial Action Completion Report**	Jul 31, 2007
9	Effectiveness of Groundwater Extraction and FPLH Recovery System – Iron Precipitation in Tank 302/Interceptor Trench Extraction Systems **Feasibility Study; RAP (as needed); Implementation Schedule (as needed)**	Oct 01, 2007
10	Groundwater Quality and FPLH Seeps – Tank 100 Containment Block Area **Remedial Action Completion Report**	Feb 01, 2008
11	**Update Groundwater Self-Monitoring Program**	30 Days After Implementation of Tasks

The Discharger shall submit Technical Reports per the schedule established in the Tasks section of this Order, summarized above in Table 4. Reports due at the same time may be combined into one report for convenience, as long as the findings pertaining to each submittal are clearly distinguishable. Groundwater Self-Monitoring Reports for this Site are submitted per the schedule established in WDR Order No. R2-2005-0026.

ATTACHMENT A

WDR ORDER NO. R2-2005-0026
SELF-MONITORING PROGRAM FOR

CONOCOPHILLIPS COMPANY

PER SITE CLEANUP REQUIREMENTS TASK NO. 11:

"The Discharger shall review the Facility's WDR Order No. R2-2005-0026 Self-Monitoring Program and propose any necessary updates to incorporate new groundwater monitoring wells, extraction systems, and/or sampling parameters. All sampling protocols and reporting requirements shall be consistent with those described in WDR Order No. R2-2005-0026"